Module 2/3

Dalton’s Atomic Theory

2) Dalton's atomic theory :-

i) Every matter is made up of tiny particles called atoms.

ii) Atoms are indivisible particles, which cannot be created nor destroyed in a chemical reaction.

iii) Atoms of a given element are identical in mass and chemical properties.

iv) Atoms of different elements have different masses and chemical properties.

v) Atoms combine in the ratio of small whole number

to form compounds.

vi) The relative number and kinds of atoms are constant in a given compound.

3) Atom :-

Atoms are building blocks of all matters.

Atomic radius is measured in nanometres (nm)

1 nanometer = 10^{-9} m or 1 meter = 10^{9} nm

Eg :- The atomic radius of an atom of hydrogen is 10^{-10} m.

The radius of a molecule of water is 10^{-9} m.

Atoms are invisible to light itself.

Atoms aggregate in large numbers to form the matter that we can see , feel or touch.

4) Symbols of atoms of different elements :-

The symbols of elements are represented by letters.

The symbols of some elements are represented by one letter and the symbols of some elements are represented by two letters.

If the symbol has only one letter it should be written as capital letter and if the symbol has two letters then the first letter should be capital letter and the second letter should be small letter.

Symbols of some common elements :-

Element	Symbol	Element	Symbol	Element	Symbol
Aluminium	Al	Copper	Cu	Nitrogen	N
Argon	Ar	Fluorine	F	Oxygen	O
Barium	Ba	Gold	Au	Potassium	K
Boron	B	Hydrogen	H	Silicon	Si
Bromine	Br	Iodine	I	Silver	Ag
Calcium	Ca	Iron	Fe	Sodium	Na
Carbon	C	Lead	Pb	Sulphur	S
Chlorine	Cl	Magnesium	Mg	Uranium	U
Cobalt	Co	Neon	Ne	Zinc	Zn

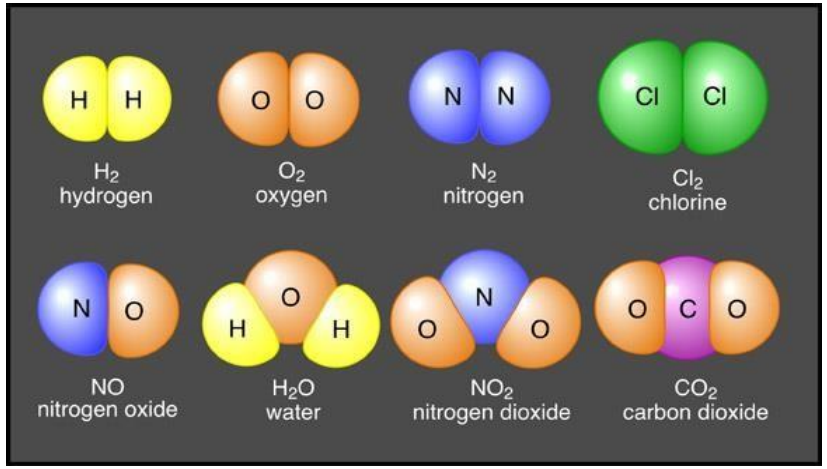
Atoms of most elements are not able to exist independently. Atoms form molecules and ions.

5. Molecule:

A molecule is the smallest particle of an element or compound which exists independently and shows all the properties of that substance.

A molecule is a group of two or more elements that are held together by attractive forces.

Atoms of the same element or different elements can join together to form molecules.



i) Molecule of elements :-

Molecules of an element are formed by the atoms of the same type. Molecules of some elements contain only one atom and molecules of some elements contain two or more atoms.

The number of atoms constituting a molecule is known as its atomicity.

Atomicity of some elements :-

Type of element	Name		Atomicity
Non metal	Argon	Ar	1 – Monoatomic
Non metal	Helium	He	1 – Monoatomic
Non metal	Oxygen	O_2	2 – Diatomic
Non metal	Hydrogen	H_2	2 – Diatomic
Non metal	Nitrogen	N_2	2 – Diatomic
Non metal	Chlorine	Cl_2	2 – Diatomic
Npn metal	Phosphorus	P_4	4 – Phosphorus
Non metal	Sulphur	S_8	Poly atomic
Metal	Sodium	Na	1 – Monoatomic
Metal	Iron	Fe	1 – Monoatomic
Metal	Aluminium	Al	1 – Monoatomic
Metal	Copper	Cu	1 – Monoatomic

ii) Molecule of compounds :-

Atoms of same or different elements join together in definite proportions to form molecules of compounds.

Molecules of some compounds :-

Compound	Combining elements	Number of atoms of each elements
Water – H_2O	Hydrogen, Oxygen	2 - Hydrogen, 1 - Oxygen
Ammonia – NH_3	Nitrogen, Hydrogen	1 - Nitrogen, 3 - Hydrogen
Carbon dioxide CO_2	Carbon, Oxygen	I - Carbon, 2 - Oxygen
Hydrochloric acid HCl	Hydrogen, Chlorine	1 - Hydrogen, 1 - Chlorine
Nitric acid HNO_3	Hydrogen, Nitrogen, Oxygen	1 - Hydrogen, 1 - Nitrogen, 3 - Oxygen
Sulphuric acid H_2SO_4	Hydrogen, Sulphur, Oxygen	2 - Hydrogen, 1 - Sulphur, 4 - Oxygen